

1 Chapter Review

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Everything that has mass and takes up space is matter.



KEY CONCEPTS SUMMARY

1.1 Matter has mass and volume.



Mass is a measure of how much matter an object contains.



Volume is the measure of the amount of space matter occupies.

VOCABULARY

matter p. 9
mass p. 10
weight p. 11
volume p. 11

1.2 Matter is made of atoms.



An atom is the smallest basic unit of matter. Two or more atoms bonded together form a molecule. Atoms and molecules are always in motion.

VOCABULARY

atom p. 16
molecule p. 18

1.3 Matter combines to form different substances.



Matter can be pure, such as an element (gold), or a compound (water).



Matter can be a mixture. Mixtures contain two or more pure substances.

VOCABULARY

element p. 22
compound p. 23
mixture p. 23

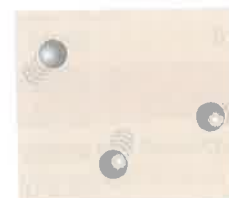
1.4 Matter exists in different physical states.



Solids have a fixed volume and a fixed shape.



Liquids have a fixed volume but no fixed shape.



Gases have no fixed volume and no fixed shape.

VOCABULARY

states of matter p. 27
solid p. 28
liquid p. 28
gas p. 28

Reviewing Vocabulary

Copy and complete the chart below. If the right column is blank, give a brief description or definition. If the left column is blank, give the correct term.

Term	Description
1.	the downward pull of gravity on an object
2. liquid	
3.	the smallest basic unit of matter
4. solid	
5.	state of matter with no fixed volume and no fixed shape
6.	a combination of different substances that remain individual substances
7. matter	
8.	a measure of how much matter an object contains
9. element	
10.	a particle made of two or more atoms bonded together
11. compound	

Reviewing Key Concepts

Multiple Choice Choose the letter of the best answer.

12. The standard unit for measuring mass is the
 a. kilogram
 b. gram per cubic centimeter
 c. milliliter
 d. milliliter per cubic centimeter

13. A unit for measuring the volume of a liquid is the
 a. kilogram
 b. gram per cubic centimeter
 c. milliliter
 d. milliliter per cubic centimeter

14. The weight of an object is measured by using a scale that
 a. compares the mass of the object with a standard unit of mass
 b. shows the amount of space the object occupies
 c. indicates how much water is displaced by the object
 d. tells how hard the object is pushing or pulling on it

15. To find the volume of a rectangular box,
 a. divide the length by the height
 b. multiply the length, width, and height
 c. subtract the mass from the weight
 d. multiply one atom's mass by the total

16. Compounds can be separated only by
 a. breaking the atoms into smaller pieces
 b. breaking the bonds between the atoms
 c. using a magnet to attract certain atoms
 d. evaporating the liquid that contains the atoms

17. Whether a substance is a solid, a liquid, or a gas depends on how close its atoms are to one another and
 a. the volume of each atom
 b. how much matter the atoms have
 c. how free the atoms are to move
 d. the size of the container

18. A liquid has
 a. a fixed volume and a fixed shape
 b. no fixed volume and a fixed shape
 c. a fixed volume and no fixed shape
 d. no fixed volume and no fixed shape

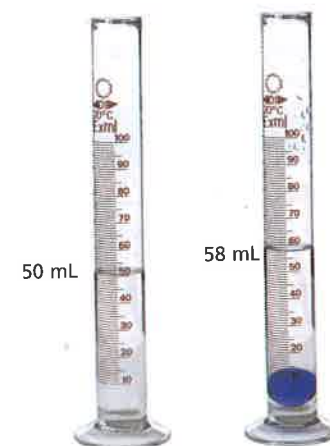
Short Answer Answer each of the following questions in a sentence or two.

19. Describe the movement of particles in a solid, a liquid, and a gas.
20. In bright sunlight, dust particles in the air appear to dart about. What causes this effect?
21. Why is the volume of a rectangular object measured in cubic units?
22. Describe how the molecules in the air behave when you pump air into a bicycle tire.

Thinking Critically

23. **CLASSIFY** Write the headings *Matter* and *Not Matter* on your paper. Place each of these terms in the correct category: wood, water, metal, air, light, sound.
24. **INFER** If you could break up a carbon dioxide molecule, would you still have carbon dioxide? Explain your answer.
25. **MODEL** In what ways is sand in a bowl like a liquid? In what ways is it different?
26. **INFER** If you cut a hole in a basketball, what happens to the gas inside?
27. **COMPARE AND CONTRAST** Create a Venn diagram that shows how mixtures and compounds are alike and different.
28. **ANALYZE** If you place a solid rubber ball into a box, why doesn't the ball change its shape to fit the container?
29. **CALCULATE** What is the volume of an aquarium that is 120 cm long, 60 cm wide, and 100 cm high?
30. **CALCULATE** A truck whose bed is 2.5 m long, 1.5 m wide, and 1 m high is delivering sand for a sand-sculpture competition. How many trips must the truck make to deliver 7 cubic meters of sand?

Use the information in the photograph below to answer the next three questions.



31. **INFER** One way to find the volume of a marble is by displacement. To determine a marble's volume, add 50 mL of water to a graduated cylinder and place the marble in the cylinder. Why does the water level change when you put the marble in the cylinder?
32. **CALCULATE** What is the volume of the marble?
33. **PREDICT** If you carefully removed the marble and let all of the water on it drain back into the cylinder, what would the volume of the water be? Explain.
34. **SYNTHESIZE** Look back at the photograph on pages 6–7. Describe the picture in terms of states of matter.
35. **WRITE** Make a list of all the matter in a two-meter radius around you. Classify each as a solid, liquid, or gas.

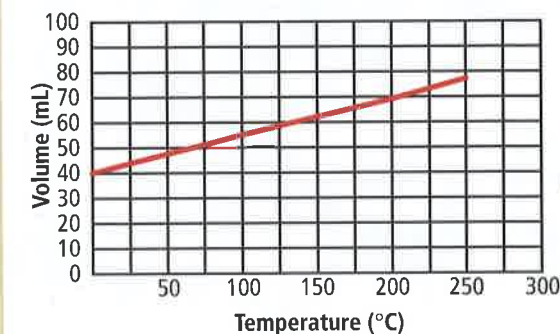
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UNIT PROJECTS

If you are doing a unit project, make a folder for your project. Include in your folder a list of the resources you will need, the date on which the project is due, and a schedule to track your progress. Begin gathering data.

Interpreting Graphs

The graph below shows the changing volume of a gas as it was slowly heated, with the pressure held constant.



Use the graph to answer the questions.

1. As the temperature of the gas rises, what happens to its volume?
 - a. It increases.
 - b. It stays the same.
 - c. It decreases.
 - d. It changes without pattern.
2. What is the volume of the gas at 250°C as compared with the volume at 0°C?
 - a. about three times greater
 - b. about double
 - c. about one-half
 - d. about the same
3. What happens to a gas as it is cooled below 0°C?
 - a. The volume would increase.
 - b. The volume would continue to decrease.
 - c. The volume would remain at 40 mL.
 - d. A gas cannot be cooled below 0°C.
4. If you raised the temperature of this gas to 300°C, what would be its approximate volume?
 - a. 70 mL
 - b. 75 mL
 - c. 80 mL
 - d. 85 mL
5. If the volume of the gas at 0°C was 80 mL instead of 40 mL, what would you expect the volume to be at 200°C?
 - a. 35 mL
 - b. 70 mL
 - c. 80 mL
 - d. 140 mL

Extended Response

Answer the two questions below in detail. Include some of the terms from the word box. Underline each term you use in your answer.

gravity	mass	molecule
states of matter	weight	

6. An astronaut's helmet, measured on a balance, has the same number of kilograms on both Earth and the Moon. On a spring scale, though, it registers more newtons on Earth than on the Moon. Why?
7. Explain how water changes as it moves from a solid to a liquid and then to a gas.